Neonatal resuscitation procedures: Suggested addendum for the IACC strategic plan

Eileen Nicole Simon, PhD (Biochemistry), RN
conradsimon.org, 11 Hayes Avenue, Lexington MA 02420-3521, (617) 512-0424

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Can members of the IACC engage in discussions with neonatal care professionals?

Clamping the umbilical cord at birth can lead to ischemic injury of the brain.

The auditory system is most vulnerable to sudden ischemia within the brain.

Auditory system impairment can make it difficult for a child to learn to speak.

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Pulmonary respiration cannot begin until capillaries surrounding the alveoli are filled.

Blood to fill the alveolar capillaries comes from placental circulation continuing after birth.

If the umbilical cord is clamped, blood is diverted from other organs, and brain, to the lungs.

The first breath provides evidence that pulmonary circulation has been established.

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Ventilation of the un-inflated lungs can cause injury [1].

The alveoli open in response to filling of their surrounding capillaries [2].

Placental blood is respiratory blood -- CO_2 via hemoglobin may help expand the alveoli.

Placental circulation should continue until transition to pulmonary respiration is complete.

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Resuscitation should be done with the umbilical cord intact.

Fetal to neonatal transition cannot be expected to take place immediately.

Transition is not complete until the foramen ovale and ductus arteriosus have closed.

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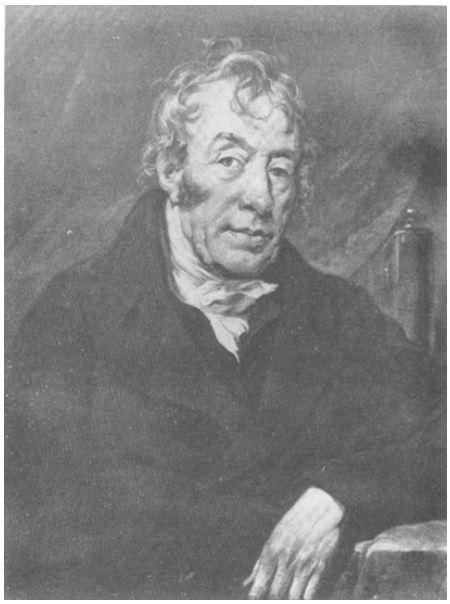
References

1. Escobedo M. Moving from experience to evidence: changes in US Neonatal Resuscitation Program based on International Liaison Committee on Resuscitation Review. J Perinatol. 2008 May;28 Suppl 1:S35-40.
2. Jäykkä S. Capillary erection and the structural appearance of fetal and neonatal lungs. Acta Paediatr. 1958 Sep;47(5):484-500.

Transition from fetal to postnatal circulation

Clamping the umbilical cord at birth is a human invention, and has long been the subject of controversy. It is no doubt instinctive for most obstetricians and midwives to wait for an infant's first breath before clamping the cord; until the 1980s this was explicitly stated in most textbooks of obstetrics and midwifery. Many texts also taught that the cord should not be cut until pulsations in it had ceased. Pulsations in the cord are from the infant's heart, pumping blood to the placenta for oxygen and nutrients. Valves in the heart that direct blood flow to the placenta close after full inflation of the lungs, but this can take up to 20 minutes or more after birth.



Charles White (1728-1813)

In 1773, Dr. Charles White commented:

"Can it possibly be supposed that this important event, this great change which takes place in the lungs, the heart, and the liver, from the state of a foetus, kept alive by the umbilical cord, to that state when life cannot be carried on without respiration, whereby the lungs must be fully expanded with air, and the whole mass of blood instead of one fourth part be circulated through them, the ductus venosus, foramen ovale, ductus arteriosus, and the umbilical arteries and vein must all be closed, and the mode of circulation in the principal vessels entirely altered -- Is it possible that this wonderful alteration in the human machine should be properly brought about in one instant of time, and at the will of a by-stander?"

White C (1773) *A Treatise on the Management of Pregnant and Lying-In Women.* Canton, MA: Science History Publications, 1987, p 45

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